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EXAMINER

SINGH, DALZID E

ART UNIT PAPER NUMBER

2633

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/965,269

Applicant(s)

PARK ET AL.

Examiner

Dalzid Singh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 September 2001.  
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-12, 15 and 18-24 is/are rejected.  
 7) ☒ Claim(s) 13, 14, 16 and 17 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 9/27/01; 9/17/03.  
 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) ☐ Notice of Informal Patent Application (PTO-152)  
 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “an adaptive controller (AC) adapted to control the dispersion compensation applied by the DCE” as claimed in claim 3, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Zhou et al (US Patent No. 6,445,850).

Regarding claim 1, Zhou et al disclose DWDM transmission system comprising:

an optical add/drop multiplexer (shown in Fig. 4) having add paths for adding channels (shown in figure as Add) to any of the at least one output optical fiber links (421), and drop channels (shown in figure as Drop) for extracting channel signals from any of the at least one input optical fiber links (401);

an adaptive dispersion compensation module (ADCM) in each drop path adapted to compensate for intra-channel wavelength dispersion in a received dropped channel signal (Zhou et al show dispersion compensation module (406.1 to 406.p) which is tunable and therefore adaptive (see col. 11, lines 14-17); and

an optical transmitter for each add path (since signal, such as (413 or 415), is added, therefore there must be transmitter for generating the added signal).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al (US Patent No. 6,445,850) in view of Liu et al (US Patent No. 6,829,438).

Regarding claim 2, as discussed above, Zhou et al disclose DWDM transmission system comprising of transmitter to add new signal and differ from the claimed invention in that Zhou et al do not specifically disclose that the transmitter for each add path comprises a tunable optical laser. However, in optical communication system it is well known to use tunable optical laser to generate optical signal. Liu et al is cited to show such well known concept. In col. 5, lines 64-67 to col. 6, lines 1-6, Liu et al disclose the use of tunable laser. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide tunable laser, as taught by Liu et al, to the system of Zhou et al. One of ordinary skill in the art would have been motivated to do so in order to transmit multiple optical signals using a single optical laser.

6. Claims 3-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al (US Patent No. 6,445,850) in view of Ooi et al (US Pub. No. 2002/0015207).

Regarding claim 3, as discussed above, Zhou et al disclose dispersion compensation element which is tunable (see col. 11, lines 14-17) and differ from the claimed invention in that Zhou et al do not specifically disclose that an adaptive controller (AC) adapted to control the dispersion compensation applied by the DCE. However, since Zhou et al disclose that dispersion compensation element is tunable, therefore it would have been obvious that there exist a controller for controlling the dispersion compensation element. Ooi et al is cited to show such well known concept. In paragraph [0068], lines 8-9, Ooi et al disclose the use of control circuit for controlling the dispersion compensator. Therefore, it would have been obvious to an artisan of ordinary skill in the art to provide a controller for controlling the dispersion compensator. One of ordinary skill in the art would have been motivated to provide such controller in order to properly tune dispersion of the signal.

Regarding claim 4, in view of rejection of claim 3, Ooi et al further disclose receiving control feedback from a downstream signal analyzer (monitor circuit), and to use the feedback to adjust the dispersion compensation applied to the signal, in order to minimize the intra-channel dispersion of the dropped channel signal (the control feedback is received from dispersion monitor circuit; see paragraph [0068], lines 8-10).

Regarding claim 5, in view of the above, Ooi et al further disclose a signal analyzer (monitor) that receives a portion of the channel signal via a drop path signal tap and a receiver adapted to convert the channel signal to a digital electrical signal

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(see paragraph [0068], lines 1-13; the optical coupler receives portion of optical signal and the PIN-PD convert the optical signal into electrical signal).

Regarding claim 6, in view of the above, Ooi et al disclose that the control feedback comprises a parameter related to dispersion (it would have been obvious that the parameter is related to dispersion since the signal control dispersion).

Regarding claim 7, the combination of Zhou et al and Ooi et al disclose control of dispersion element using a particular parameter of the control signal and differ from the claimed invention in that the combination does not specifically disclose that the parameter comprises at least one of: a signal-to-noise ratio; a signal dispersion measure; at least one feature of an eye-closure diagram; a spectral content analysis of the signal; and a bit error rate associated with data encoded by the signal. However, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such parameters in order to adjust the dispersion compensator.

Regarding claim 8, the combination of Zhou et al and Ooi et al disclose control of dispersion element using a particular parameter of the control signal and differ from the claimed invention in that the combination does not specifically disclose the adaptive controller computes a coarse-grain signal dispersion adjustment setting based on an estimate of the channel signal's intra-channel dispersion. However, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such adjustment in order to tune the dispersion compensator.

Regarding claim 9, the combination of Zhou et al and Ooi et al disclose control of dispersion element using a particular parameter of the control signal and differ from the claimed invention in that the combination does not specifically disclose that the estimated dispersion is calculated using at least one of: a distance that the optical signal has traveled through the network; the type of optical fiber links over which the signal was conveyed; the channel's center wavelength; and, the amount of dispersion compensation applied to the channel a last time the channel was dropped. However, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such parameters in order to adjust the dispersion compensator.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al (US Patent No. 6,445,850).

Regarding claim 10, as shown in Fig. 4, Zhou et al show an optical pre-amplifier (402), a bulk dispersion slope compensation module (DSCM) adapted to correct for intra-channel dispersion incurred in all of the channels during transmission through the input optical fiber link (406.1) and an optical power amplifier (420). Zhou et al differ from the claimed invention in that Zhou et al do not specifically disclose a de-multiplexer for de-multiplexing the plurality of channels. However, in Fig. 2a Zhou et al show demultiplexer for demultiplexing the optical channels. Therefore, it would have been obvious to an artisan of ordinary skill in the art to provide demultiplexer to the output of



the amplifier (420) as shown in Fig. 4 in order to separate the signal into its individual channels.

8. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al (US Patent No. 6,445,850) in view of the prior art disclose by applicant as Fig. 1.

Regarding claims 11 and 15, as discussed above, Zhou et al disclose add/drop system comprising of demultiplexer and differ from the claimed invention in that Zhou et al do not specifically disclose that the optical add/drop multiplexer further comprises an all-optical switch adapted to selectively switch each de-multiplexed channel and each added channel to one of a drop path, and an output channel path. However, add/drop system comprising of optical switch is well known. Fig. 1 of applicants prior art show such well known concept. In Fig. 1, the prior art shows optical switch (PXC) with plurality of input and plurality of output coupled to the demultiplexer (26). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention as made to couple optical switch to the demultiplexer. One of ordinary skill the art would have been motivated to do such in order to selectively switch each optical channel to a desired output port.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al (US Patent No. 6,445,850) in view of the prior art disclose by applicant as Fig. 1 and further in view of Asahi (US Patent No. 6,704,508).

Regarding claim 12, the combination of Zhou et al and the prior art disclose optical system and differs from the claimed invention in that the combination does not disclose variable attenuator coupled to each of output channel. However, it is well known to use variable optical attenuator in optical system. Asahi is cited to show such well known concept. In Fig. 14, Asahi shows the use of variable optical attenuator (210-1 to 210-n) on each output channel. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such variable attenuator to each output channel. One of ordinary skill in the art would have been motivated to do such in order to adjust optical power or optical intensity of each channel and compensate for losses.

10. Claims 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ooi et al (US Pub. No. 2002/0015207).

Regarding claim 18, Ooi et al disclose for dispersion comprising steps of:  
receiving the signal on a channel (see paragraph [0068] lines 1-4; the signal is extracted and received by the monitor);

analyzing a quality of the received signal (the monitoring unit and power sensor analyzed quality of the signal by measuring the power intensity; see paragraph [0068] lines 1-15);

sending a measure of the quality to an adaptive controller (AC) of a dispersion compensation element (DCE) (the measured quality from the monitor unit is sent to the control unit; see paragraph [0068] lines 8-10); and,

controlling the DCE to apply the dispersion compensation adjustment to the signal in order to reduce intra-channel dispersion of the signal (the control unit controls the dispersion compensator; see paragraph [0068] lines 8-10).

Ooi et al disclose monitoring and sensing power of the signal and differ from the claimed invention in that Ooi et al do not specifically disclose computing a dispersion compensation adjustment at the adaptive controller (AC) using the measure of quality. However, Ooi et al disclose that the control unit received signal from monitor unit and based on that signal, controls the dispersion compensator. Therefore, it would have been obvious that the controller of Ooi et al provides method or means for computing compensation adjustment in order to accurately adjust the dispersion compensator. One of ordinary skill in the art would have been motivated to do such in order to accurately compensate deviation of signal quality from a desired value.

Regarding claims 19 and 23, in paragraph [0068] lines 10-12, Ooi et al disclose converting the signal from an optical signal to an analog electrical signal and differ from the claimed invention in that Ooi et al do not specifically disclose computing an eye-closure diagram using properties of the analog electrical signal. However, since there various methods of measuring signal quality, therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide method of computing an eye-closure diagram using the measured signal.

Regarding claims 20 and 24, as discussed above, since there various methods of measuring signal quality, therefore it would have been obvious to an artisan of ordinary

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skill in the art at the time the invention was made to provide method of determining a quality of the signal using eye-closure diagram.

Regarding claim 21, in paragraph [0068] lines 1-12, Ooi et al disclose of receiving comprises steps of receiving a portion of the signal sent to the DCE at a signal analyzer (the received signal is monitored by monitor unit which analyzed the signal).

Regarding claim 22, in paragraph [0068] lines 1-12, Ooi et al disclose step of analyzing comprises a step of analyzing the optical signal at the signal analyzer, in order to measure signal quality (the monitor unit analyzed the signal).

### ***Allowable Subject Matter***

11. Claims 13, 14, 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cao (US Patent No. 6,169,616) is cited to show optical and programmable fiber optic wavelength add/drop system.

Zhang et al (US Patent No. 6,621,625) is cited to show optical node including dispersion compensation control.

Matsuoka et al (US Patent No. 6,771,854) is cited to show optical transmission system comprising add/drop with dispersion compensation.

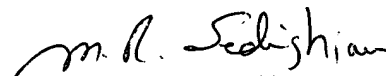
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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS  
March 18, 2005

  
**M. R. SEDIGHIAN**  
**PRIMARY EXAMINER**